

8-6C Mixture, Motion, and Work Problems

weighted averages: a method for finding the mean of a set of numbers in which some elements carry more importance, or weight, than others.

- weighted grades
- mixture problems
- distance (motion) problems
- work problems

$$\frac{P}{100} = \frac{15}{of}$$

$$\frac{P}{100} = \frac{100}{350}$$

What's 26% of 350 students.

100 students? is 90 of 350?

$$\frac{20}{100} = \frac{x}{350}$$

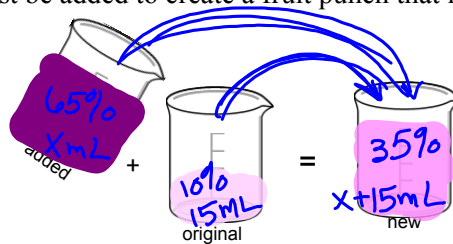
$$2d(350) = 100x$$

$$d = rt$$

$$r = \frac{d}{t}$$

$$t = \frac{d}{r}$$

1. **Mixture Problems:** Logan adds a 65% fruit solution to 15 milliliters of a drink that is 10% fruit juice. How much of the 65% fruit juice solution must be added to create a fruit punch that is 35% fruit juice?



	original	added	new
amount of fruit juice	1.5 mL	.65x	$(1.5 + .65x)$ mL
total solution	15 mL	+ x	$(x + 15)$ mL

$$\frac{35}{100} = \frac{(1.5 + .65x)}{(x + 15)}$$

$$35(x + 15) = 100(1.5 + .65x)$$

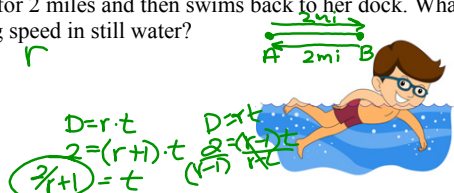
$$35x + 525 = 150 + 65x$$

$$375 = 30x$$

$$12.5 = x$$

$$12.5 \text{ mL}$$

1. **Motion Problems:** **Gabbeigh** swims for 5 hours in a stream that has a current of 1 mile per hour. She leaves her dock, swims upstream for 2 miles and then swims back to her dock. What is her swimming speed in still water?



$D = r \cdot t$
 $2 = (r+1) \cdot t$
 $\frac{2}{r+1} = t$
 $D = r \cdot t$
 $2 = (r-1) \cdot t$
 $\frac{2}{r-1} = t$

time with current	time against current	total time
$\frac{2}{r+1}$	$\frac{2}{r-1}$	$= 5$

$$\frac{2}{r+1} + \frac{2}{r-1} = 5(r^2-1)$$

$$2(r-1) + 2(r+1) = 5(r^2-1)$$

$$2r - 2 + 2r + 2 = 5r^2 - 5$$

$$4r = 5r^2 - 5$$

$$0 = 5r^2 - 4r - 5$$

$$r = \frac{4 \pm \sqrt{(-4)^2 - 4(5)(-5)}}{2(5)}$$

$$r = \frac{4 \pm \sqrt{16 + 100}}{10}$$

$$r = \frac{4 \pm \sqrt{116}}{10} \approx 1.47 \text{ mph}$$

3. **Work Problems:** **Trey & Denny** mow lawns together. **Trey** working alone could *barely* complete the job in 4.5 hours. **Denny** on the other hand, could complete the job alone in 3.7 hours. How long does it take them to complete the job when they work together?

$$\frac{1}{4.5} = 4.5 \cdot t$$

$$\frac{1}{3.7} = 3.7 \cdot t$$

$$\frac{1}{3.7} = t$$

LCM = 16.65

$$\frac{16.65}{4.5} X + \frac{16.65}{3.7} X = 16.65$$

$$3.7X + 4.5X = 16.65$$

$$8.2X = 16.65$$

$$X = 2.03 \text{ hrs}$$



8-6C Worksheet

Attachments

9-2HW.notebook